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ABSTRACT

The purpose of this paper is to operationally define four components of a mental set and describe how students can be taught to be aware of and control their mental set. Parameters of mental set include affect, attitude, focus, and meaning. It is argued that many factors essential to the success of a given task are at least partially, and perhaps greatly, controlled by the affective tone of an individual; the individual's attitudes; the extent to which the individual is goal-directed; and the situational meaning the individual generates. These elements constitute the "context" in which individuals operate from moment to moment. Certain dispositions relative to these parameters "set up" success; others "set up" failure. It is further argued that one of the primary reasons for the breakdown of many classroom learning experiences is poor contextual thinking by students, and perhaps by teachers. While good contextual thinking will not insure knowledge acquisition, its absence will defeat most presentations of content area knowledge. The proposed strategy for contextual thinking, which is meant to be taught and reinforced in the classroom, attempts to make students aware of the four elements of an individual's context, and provide them with a technique for monitoring and controlling the elements in various situations. (RH)

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CONTEXTUAL THINKING: THE MOST BASIC OF THE COGNITIVE SKILLS

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Recently there has been a rather strong call from both researchers and practitioners for direct instruction in various cognitive skills and strategies considered important for academic and non-academic success. There are those who have identified various reasoning skills which should be taught directly in the classroom (Ennis,1986), others contend that specific strategies can be taught to enhance reading (Palincsar and Brown, 1983), still others have identified specific strategies for solving various types of problems (Bransford and Stein, 1984). These are all highly useful activities and will no doubt greatly enhance students' acquisition of some important cognitive abilities. However, unless students are taught the importance and control of the "mental set" with which they approach a general situation or a specific task, even the most effective program in skill or strategy instruction will be of little use. In other words, we are asserting that there is a type of thinking which sets the "context" in which you work on a task or approach a situation.

The notion that your mental set, at any point in time, colors all your behavior, rendering it more or less effective, is a very powerful one. If valid, it implies that an awareness and control of your mental set can provide some control over your experience and proficiency in a particular situation. Perkins (1987) has alluded to the possibility that one's mental set (which he calls a frame)

is an important considerations relative to the teaching of any skill. We go a step further. It is our assertion that the mental set from which you are operating within a given situation, is the primary factor determining your behavior within that situation. Your mental set will affect such variables as the effort you put into the task at hand, your persistence, the level of satisfaction you gain from the task and many other factors.

It is our purpose in this paper to operationally define the components of a mental set and describe how students can be taught to be aware of and even control their mental set within the classroom. We will refer to awareness of and control over your mental set as "contextual thinking." As the previous comments indicate, it is effective contextual thinking which we believe is a prerequisite to success at any task. Consequently, the fostering of contextual thinking in the classroom should be a prerequisite for direct instruction in any skill or competency.

There are four dimensions to, or parameters of, a mental set: 1) affect, 2) attitude 3) focus and 4) meaning. We will consider each briefly and then describe a strategy for fostering contextual thinking.

AFFECT

Most theories of cognition emphasize the strong connection between affect and intellect. For example,

Piaget (1962) noted that "we must agree that at no level, at no stage even in the adult, can we find a behavior or a state which is purely cognitive without affect nor a purely affective state without a cognitive element involved" (p. 130). Similarly, Meichenbaum (1977) has stated that the "inseparably interactive relationship between cognition and affect" attests to the need for control and monitoring of affect relative to specific tasks.

In general, the terms affect and emotion are used interchangeably when discussing responses of relatively short duration, whereas the term mood is used to describe a "disposition persisting over time" (Owens and Maxmen, 1979). From a physiological perspective, affect is generated by a set of related systems of the mid-brain which are referred to by MacLean (1959) and others as the "limbic system." According to Luria (1973), it is not the function of this system to communicate with the outside world; rather it is the function of this system to regulate the general "backdrop of emotion" for a situation.

This emotional backdrop determines the intensity with which we respond to situations--how strong or weak our reactions will be. More specifically, Mandler (1983) explains that if your emotional backdrop has high intensity, then you will respond intensely either positively or negatively to a situation. If your emotional backdrop has low intensity, then you will not respond intensely to the situation. Piaget (1981) made this same point in his

assertion that emotions are the "energy source" for intellectual functioning. In fact, he likened emotions to gasoline which fuels the engine of intellect.

A useful question relative to contextual thinking is how can you change your emotional backdrop and consequently your energy level at any point in time? It appears that when your emotional backdrop has high intensity, it is very difficult to change (Heliman and Satz, 1983). In other words, when you have a high energy backdrop (whether negative or positive), it is very difficult to lessen that energy. However, you can dampen the effects of a high intensity backdrop simply by being aware of it. More specifically, if you realize that you are operating from a high intensity emotional backdrop, this awareness can help you de-emphasize its effects (e.g.,"I know I'm emotional right now. I'm going to try not to let that affect what I'm doing."). Of course, this is consistent with some of Ellis' (1962) techniques within rational emotive therapy in which an individual uses self-talk to regulate the effects of reactive emotional responses. Similar techniques have also been developed by many others (e.g., Meichenbaum, 1977; Santostefano, 1986).

When your emotional backdrop is low, it is more malleable and easier (although not easy) to change. Sometimes, a low intensity backdrop is generated by physiological factors (e.g., an illness, not enough sleep). In such cases, it is difficult if not impossible to generate

higher energy. However, when the emotional backdrop is low simply because of lack of interests or engagement in the situation at hand, a higher intensity can be generated by exhibiting those artifacts of high intensity. Specifically, Bettencourt and his associates (Bettencourt, Gillett, Gall and Hull, 1983) found that by practicing such secondary characteristic of enthusiasm as extended eye contact, animated gestures, an erect body position, a higher level of enthusiasm could be generated for the task at hand. In other words, if you are approaching a task with low energy, then simply acting as you would if your were enthusiastic, can generate genuine enthusiasm.

The notion that "pretending" to be a certain way acutally generates the desired characteristics is a powerful one which is gaining experimental support. For example, British psychologist Robert Hartley (in Chance, 1987) found that when students pretended to possess certain intellectual abilities, they actually performed as if they did indeed, possess those abilities. Acting or pretending as though you have energy, then, can generate a higher intensity emotional backdrop. More specifically, we are asserting that a low energy level can be artificially raised by an individual pretending to have high energy and activating those secondary characteristics (e.g., certain body positions, eye contact, rhythm of breathing) associated with high energy.

In terms of contextual thinking then, an important component is the awareness of your emotional backdrop at any

given time. It is this backdrop which to a great extent will dictate the level of energy you have. When your emotional backdrop is high, then it is very difficult to change; however, it is possible to control the effects of that backdrop. When the emotional backdrop is low because of certain physiological factors it, again, is very difficult to change. However, when your emotional backdrop is low simply because energy has not been elicited as a by-product of the current activity in which you are engaged, then it can be artificially changed simply by attending to the secondary characteristics associated with high energy and pretending to have energy until it is generated.

Although the emotional backdrop generated by the limbic system regulates the energy brought to a task, it does not dictate the value placed on the task. That is, the intensity level generated by your emotional backdrop is neutral in value; it gets translated into a negative emotion or a positive emotion based on the value that you place on the task in which you are involved. For example, if your limbic system has generated a high intensity backdrop and you are in a situation which you consider to be negative, then you will react very negatively, perhaps more negatively than is warranted by the situation. Conversely, if your limbic system has generated a high intensity backdrop and you are in a situation which you consider to be positive, then you will react very positively, perhaps more positively than is warranted. Value, then, translates the emotional

backdrop into positive or negative emotion. The value you ascribe to a situation is a function of your attitudes about the situation.

ATTITUDES

According to the dictionary, an attitude is "a mental position with regard to a fact or state; a feeling or emotion toward a fact or state." (Webster's Ninth New Collegiate Dictionary, 1986, p.114). By definition, an attitude contains an emotional component and a mental position. The intensity of the emotional component, as we have seen, is generated by the emotional backdrop associated with the attitude. The mental position contains the value placed on the situation which in turn determines whether the emotion associated with the situation is positive or negative.

It is commonly believed that "mental positions " are stored linguistically rather than as images. More specifically, most theories of information storage (e.g., Paivio's dual coding theory (1971) posit at least two primary types of information: 1) imagery information and 2) linguistic information. Imagery information is stored as mental pictures, kinesthetic associations and sensory associations. For example, if a pleasant event is recalled from the past, remembrances will probably take the form of mental pictures, sounds, smells, tastes and bodily

sensations associated with the event. These are all aspects of the imagery information which constitute the internal structure of the recalled event.

Along with the imagery information, there will be linguistic information. This is usually observable as an inner, narrative or editorial voice (Sokolov, 1972). The linguistic representation of information is commonly considered a higher form of coding than the imagery representation. In fact, some theorists (e.g., Vygotsky, 1962) have asserted that the study of human thought should focus on the linguistic representation of information since it is this type of coding which primarily separates human thought from that of lower animal forms.

Although linguistic thought is commonly observed as an inner voice, its basic form is probably far more abstract in nature. More specifically, proponents of the semiotic extension theory of information storage (McNeill, 1975) and information processing theorists (e.g., Kintsch, 1974 and van Dijk, 1980) assert that linguistic information is stored as "propositions" which can be likened to basic declarative statements. For example, van Dijk states that propositions are:

> conceptual structures that are the minimal bearers of truth or satisfaction. Thus, "John" is a concept but is not information that can be true or false... whereas "John is ill" would be a proposition because it

could be true or false. (1980, p. 207).

To illustrate the relationship between a mental position and a proposition, assume that a student has had a negative experience in a mathematics class. The student would probably store images about this experience (e.g., the picture of the teacher giving the test back with a grade of "F," the stuffy atmosphere in the room because it was a hot day, the smell of chalk). In addition, the student would store linguistic information--conclusions he had come to as a result of the experience. Among those might be the statement (proposition) "I did poorly on this math test." With the inclusion of this proposition in his remembrance of the math test, the student can be said to have developed a mental position about the test--he has stored a statement which involves value and has associated affect or emotion. This mental position would then translate the emotional backdrop associated with the incident into high negative emotions (e.g., fear, anger).

But not all mental positions can be called attitudes. How, then, does a mental position become an attitude? Some theorist, such as Anderson (1983) and Case (1985), state that the human mind has a built in "generalizer" which acts on the linguistic propositions we store. Information processing theorists, such as Kintsch (1974) and van Dijk (1980), have described this process as that of creating a "macrostructure."

Basically, what we do when we generalize a mental position is that we change a very specific concept into a general one. Using the mental position above, the generalizing process would change it from "I did poorly on this test" to "I do poorly on tests." The mental position has now become an attitude. In other words, an attitude is a mental position which is at a high level of generality and has a strong emotion attached to it. Theorists, such as Glasser (1981) and Powers (1973), assert that we operate from a complex hierarchic structure of attitudes with some positioned at the very top. These might be considered basic operating principles which govern a great deal of our actions.

As they relate to contextual thinking, then, attitudes are linguistic propositions which indicate the value we are placing on our experience at any point in time. If we have an attitude with a negative value for the activity or situation in which we are engaged, then we translate our emotional backdrop to negative emotions (e.g., anger, fear, frustration). If we have an attitude with a positive value for what we are engaged in, then we translate our emotional backdrop into positive emotions (e.g., joy, happiness).

You can become aware of your attitude or the set of attitudes from which you are operating at any point in time by becoming aware of your self-talk and listening (so to speak) for negative self-statements about the task (e.g., "This is boring.", "This isn't worth my time.") or about

yourself (e.g., "I can't do this.", "I'll never get this done on time.") Once negative attitudes have been identified, you can make a concerted effort to change your self-talk to a more positive tone (e.g.,"Maybe I can find some value in what I'm doing here.") Again, such techniques are similar to those proposed by Ellis (1962) and Meichenbaum (1977).

Changing negative self-talk to positive self-talk can also serve to increase a low energy backdrop. This is because your emotional backdrop can sometimes be caused by your attitudes. More specifically, if you have the attitude that a particular task or situation is of importance in your life, then you will probably experience a heightened energy level whenever you are involved in that task or situation. This is the assertion of those attribution theorists (e.g., Weiner, 1972,1983) who assert that affect is caused by attitudes. A low energy backdrop, then, can be changed in two ways: 1) (discussed previously) is to generate the secondary characteristics you associate with high energy; 2) is to generate attitudes which affirm that what you are doing is of importance in your life.

FOCUS

Focus refers to the ability to attend to specific information at any point in time. Virtually any model of cognition which postulates the existence of short term

memory also postulates that it has limited capacity (Norman, 1969). Broadbent (1958) was one of the first to demonstrate that human beings selectively attend to the multitude of stimuli bombarding them at any time. That is, we attend to only a small amount of information available to us given the limitations of short term memory.

The information we attend to at any point in time is of vital importance. At a very basic level, we will attend to that stimuli that is most salient within the environment. This is exhibited by young children. For example, Luria (1973) explains that an infant will naturally turn his or her head in the direction of a loud noise. He likens this to what Pavlov termed the orienting reflex. However, a much more efficient form of attention is that which is focused because of a previously established goal. So important is goal directed attention (which we are referring to as focus), that a number of psychologists have postulated that it represents an entirely different type of attention. For example, Neisser (1967) refers to goal directed attention as a "controlled state", Lindsay and Norman (1977) call it a "conscious state."

Focus, as defined here, is attention that is goal driven. The research on the educational implications of goal directed behavior is quite strong. Over forty years ago, Sears (1940) found that successful students tended to set explicit goals. More recently, Brophy (1982) found that successful students set increasingly more difficult goals

for themselves in academic situations. Bandura and Schunk (1981) found that it is best to introduce students to short term (proximal) goals first before presenting techniques for accomplishing longer term (distal) goals.

Relative to contextual thinking then, another component is the extent to which you are operating from an explicit goal at any point in time. If there is no goal from which you are operating, then your attention is not highly controlled; rather you are in more of a reactive mode to the stimuli around you. The implication, here, is not that everyone should be operating from an explicit goal all of the time. However, when you wish your actions to be most efficient, then it is useful to be clear about the goal or subgoal your are attempting to accomplish. If that goal or subgoal is not clear, then you should attempt to clarify it before continuing.

MEANING

Meaning, as it relates to contextual thinking, refers to the generation or creation of mental connections to what is already known. It is "relating" what is happening to you presently to what you already know. More specifically, the view here is that information is processed most efficiently if you relate what is occurring presently to existing cognitive structures. This requires an initial, subjective engagement with the situation or task at hand. This view is

basically phenomenological in nature. According to Berger and Luckman (1967), the human mind can create order or meaning out of almost any set of stimuli given its ability to relate what is happening in the present time to an existing knowledge base. Indeed, both metaphor and analogy are based on the human capability to relate seemingly disparate types of information (Ortony, 1980).

This implies that a prerequisite for effective processing of information is the "choice" to make the situation meaningful by relating it to what is already known. This assertion is quite consistent with current research and theory on schema. Some theorists (e.g., Rumelhart, 1980), assert that we make sense of the stimuli bombarding us at any point in time by interpreting it in terms of a specific "schema." Rumelhart likens a schema to a "packet" of information which we have organized in the mind. Gazzaniga (1985) likens them to "modules" of related information. Basically, the process of creating meaning is that of associating incoming information with what we already know--the shemata (plural of schema) we have already developed.

As it relates to contextual thinking, this implies that we process information most efficiently when we are constantly asking ourselves such questions as:"How does this relate to what I already know? How is this similar or dissimilar to some related ideas I've had?" As it relates to a classroom, this aspect of contextual thinking implies

that students should be made aware of the fact that they can, and indeed, it is their responsibility to create meaning for what they are engaged in at a particular time.

In summary, contextual thinking involves affect, attitudes, focus and meaning. At any point in time, our experience of a situation, the energy we bring to bear to it and many other factors essential to the success of a given task are at least partially and perhaps to a great extent controlled by:

-the affective tone present
-the attitudes we have at the time
-the extent to which we are focused and goal directed
-the meaning that we are generating relative to that situation

These elements are the "context" in which you operate from moment to moment. Certain dispositions relative to these parameters are a "set up" for success; other dispositions are a set up for failure. For example, if a student is asked to perform a task and his or her emotional tone is high and negative, then the student will probably expend a great deal of energy trying to avoid the task or subvert its success. Conversely, if a student is asked to perform a task at a time when his or her emotional tone is high and positive then the student will bring a great deal of positive energy to the task. The translation of the

student's energy level into a positive or negative emotion will be a direct function of the attitudes the student has about the task at hand. With an awareness of these attitudes, the student can be more in control of his energy level and possibly can dampen the effects of negative attitudes and even turn negative ones into a more positive form. When the student finds that little energy is available for this, it too can be controlled and perhaps changed by some attitudinal shifts and by artificially generating energy, through attending to its secondary characteristics.

Even given the existence of high positive energy for a task, if the student is unclear as to the direction or focus of his or her actions, activity will be inefficient; conversely, if the student has a clear sense of direction, his or her actions will be more select and efficient. Consequently, the student can increase his efficiency by clarifying his goals or subgoals periodically. Finally, if a student is not generating meaning and making connections with what is being done and what he or she already knows, then little prior knowledge will be brought to bear on the task and information will most likely be processed in a fairly superficial manner. However, if the student is generating meaning and making connections with what he or she already knows, then the new information discovered or presented while performing the task will be integrated with

old information and will help restructure and augment the student's growing body of schemata.

As mentioned previously, it is the awareness and control of these elements at any point in time that we refer to as contextual thinking. It is our assertion that contextual thinking is the most fundamental of all cognitive skills--one that can and should be taught to students. Below is described a contextual thinking strategy which can be used with students at various grade levels.

A STRATEGY FOR CONTEXTUAL THINKING

The strategy for contextual thinking proposed here attempts to make students aware of the four elements described above and provides them with a technique for monitoring and controlling these elements within a given situation. That technique is:

1. Determine what it is you are trying to accomplish. Do you have a definite goal in mind? If you don't, then generate one.
2. Identify the level of energy you are bringing to the task. Is it high or low? If your energy level is low, try to bring it up.
3. Try to be aware of your self talk as you work on your project. Note any negative statements you are making to yourself. Try to turn them into

positive statements.

4. Make a commitment to have what you are doing be meaningful to you.
5. Keep trying to relate what you are doing to what you already know? Always make links with what you already know even if they seem "far-fetched" at first.
6. Keep checking yourself on these components especially when your work is not going well. If your efficiency or productivity has dropped, then check to see if:
    a) you have lost sight of your goal
    b) your energy is low
    c) your attitude is negative
    d) you have stopped making what you are doing meaningful or you are not relating it to what you already know.

This strategy is meant to be explicitly taught to students and then reinforced in the regular classroom. For example, students could first be presented with the theory behind the contextual thinking and study its components. Key points to bring out with students would be:

- your emotional backdrop dictates your energy level at any point in time
- sometime your emotional backdrop is simply

a by-product of physiological factors

- sometimes your emotional backdrop can be changed by generating positive attitudes and/or pretending that you have enthusiasm
- goal directed behavior is more efficient than behavior which is not goal directed
- making something meaningful is a choice and is accomplished by relating what you are doing to what you already know.

Once students are aware of the constructs underlying contextual thinking, they can be presented with the contextual thinking strategy presented above or an adaptation of it. This would then be reinforced within the regular classroom. Before starting a lesson, the teacher might remind students of the strategy. As the lesson progressed, the teacher would occasionally have students check to see how they were thinking in a contextual sense. If a class was not going well, both the teacher and students would first look for a breakdown in contextual thinking. Possible explanations for the breakdown might include the following:

The lesson had broken down because students:

- had a low energy level and were not trying to cultivate a high intensity emotional backdrop.

- had negative attitudes relative to the lesson and were not trying to generate positive attitudes
- had no clear understanding of the goals or subgoals they were trying to accomplish
- were not making the lesson subjectively meaningful.

It is our assertion that one of the primary reasons for the breakdown of many classroom learning experiences is poor contextual thinking on the part of students (and perhaps even the teacher). This is not to say that contextual thinking will insure the success of a learning experience. Students must still learn what Paris and his colleagues (Paris, and Lindauer, 1983; Paris and Oka, 1986) refer to as the declarative, procedural, and conditional information important to specific cognitive operations. Declarative knowledge is factual in nature. Procedural knowledge is more process oriented. Conditional knowledge relates to when a process should be used and when it should not be used. In other words, good contextual thinking will not insure that students know the facts and skills important to a given content area. The teacher must still explicitly teach and reinforce this information. However, in the absence of sound contextual thinking, even the best presentation of content area knowledge will have little success in the classroom.

Contextual thinking, then, is the most basic cognitive skill to learn, for it is the backdrop for the acquisition of all other skills. It is our contention that direct instruction in contextual thinking can be a major factor in increasing student academic and non-academic performance. Although the general notion of contextual thinking has not been extensively tested in an experimental/control fashion, the model described above has been tested (Marzano, 1987). It was found that explicit instruction in contextual thinking and systematic reinforcement of it during regular classroom activities significantly improved student engagement and success at academic tasks.

We should note that the model presented here is meant only as a starting place for the development of more sophisticated models of contextual thinking. However, we believe that it provides a sound enough start to facilitate the rapid development of this important area.

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